AMENDMENTS TO THE CLAIMS

1. (Presently amended): A supersonic aircraft comprising:
an aerodynamic body;
a plurality of fuel tanks contained within the aerodynamic body;
a fuel transfer system communicatively coupled to the plurality of fuel tanks and capable of transferring fuel among the plurality of fuel tanks;
at least one sensor capable of indicating a flight parameter; and
a controller coupled to the at least one sensor and the fuel transfer system, the controller ~~capable of transferring fuel among the plurality of fuel tanks and adjusting the aircraft center of gravity to reduce trim drag~~ configured to transfer fuel among the plurality of fuel tanks to position the aircraft center-of-gravity in a relatively aft position when the flight parameter is indicative of supersonic flight whereby sonic boom is reduced.

2. (Presently amended): The aircraft according to Claim 1 further comprising:
at least one canard coupled to the aerodynamic body and having at least one control effector;
at least one wing coupled to the aerodynamic body and having at least one control effector; and
an inverted V-tail coupled to the aerodynamic body and having at least one control effector,
wherein~~:~~ the controller is ~~capable of transferring~~ configured to redistribute fuel among the plurality of fuel tanks and operate the control effectors on the canard, the wing, and the inverted V-tail to adjust the aircraft center of gravity to modify the aircraft lift distribution, ~~and~~ reduce trim drag ~~while attaining an attenuated~~ , and attenuate aircraft sonic boom.

3. (Presently amended): The aircraft according to Claim 1 further comprising: at least one canard coupled to the aerodynamic body.

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wherein~~:~~ the controller is ~~capable of transferring~~ adapted to transfer fuel among the plurality of fuel tanks to adjust the aircraft center of gravity aftward in a supersonic cruise condition to reduce canard trim requirements and increase aircraft controllability.

4. (Presently amended): The aircraft according to Claim 1 further comprising:

at least one canard coupled to the aerodynamic body and having at least one primary pitch control surface,

wherein~~:~~ the controller is ~~capable of transferring~~ adapted to set the at least one primary pitch control surface and transfer fuel among the plurality of fuel tanks to adjust the aircraft center of gravity in coordination to ~~maintain aircraft stability during flight~~ adjust angle-of-attack alpha (α) to prevent canard stall.

5. (Presently amended): The aircraft according to Claim 1 further comprising:

a plurality of control effectors coupled to the aerodynamic body,

wherein~~:~~ the controller is ~~capable of transferring fuel among the plurality of fuel tanks to adjust the aircraft center of gravity and adjust the aircraft longitudinal lift distribution throughout the flight envelope to maintain a low-boom, low-drag trim condition~~ adapted to operate the aircraft in a maximum range, maximum Mach mode whereby the control effectors are deployed for relatively reduced trim drag and center of gravity is positioned relatively forward, and adapted to operate the aircraft in a relatively reduced-range, relatively lower Mach mode whereby control effectors are deployed for relatively increased trim drag and center of gravity is positioned relatively aft.

6. (Presently amended): The aircraft according to Claim 1 further comprising:

a plurality of control effectors coupled to the aerodynamic body,

wherein~~:~~ the controller ~~transfers fuel among the plurality of fuel tanks to adjust the aircraft center of gravity in compliance with control laws to stabilize the aircraft and provide satisfactory handling qualities to a pilot~~ is adapted to control aircraft center-of-gravity concurrently with the plurality of control

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effectors to move the center-of-gravity more aft during supersonic operation and more forward during takeoff, approach, and landing.

7. (Presently amended): The aircraft according to Claim 1 wherein:

the controller transfers fuel among the plurality of fuel tanks to adjust the aircraft center of gravity ~~to an aft position, causing aircraft trim for a low sonic boom condition with insignificant trim drag penalty~~ so that fuel in forwardmost tanks is consumed first, configuring aircraft trim on attaining cruise condition at a maximum aft center-of-gravity for a reduced sonic boom condition.

8. (Presently amended): An automated fuel transfer system for usage in a supersonic aircraft including a fuselage and wing, the automated fuel transfer system comprising:

a plurality of fuel tanks distributed within the wing and/or the fuselage;

a plurality of pumps coupled to the plurality of fuel tanks and capable of transferring fuel among the plurality of fuel tanks;

at least one sensor capable of indicating a flight parameter; and

a controller coupled to the at least one sensor and the plurality of pumps, the controller ~~capable of transferring fuel among the plurality of fuel tanks to modify the aircraft lift distribution to reduce the aircraft sonic boom~~ configured to transfer fuel among the plurality of fuel tanks to position the aircraft center-of-gravity in a relatively aft position when the flight parameter is indicative of supersonic flight whereby lift distribution is modified and sonic boom is reduced.

9. (Original): The system according to Claim 8 further comprising:

a plurality of control effectors coupled to the fuselage and/or wing,

wherein~~:~~ the controller is capable of transferring fuel among the plurality of fuel tanks to adjust the aircraft center of gravity to adjust the aircraft center of gravity and reduce trim drag and increase aircraft range

wherein~~:~~ the controller is ~~capable of transferring~~ configured to redistribute fuel among the plurality of fuel tanks and operate the control effectors to adjust the aircraft

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center of gravity <u>aftward, reducing</u> ~~to adjust the aircraft center of gravity and reduce~~ trim drag and ~~increase~~ <u>increasing</u> aircraft range.

10. (Presently amended): The system according to Claim 8 <u>further comprising:</u>
<u>at least one canard coupled to the fuselage and/or wing,</u>
wherein~~:~~ the controller is ~~capable of transferring~~ <u>adapted to transfer</u> fuel among the plurality of fuel tanks to adjust the aircraft center of gravity <u>aftward in a supersonic cruise condition</u> to reduce <u>canard</u> trim criteria and increase aircraft controllability.

11. (Presently amended): The system according to Claim 8 <u>further comprising</u>:
<u>at least one canard coupled to the fuselage and/or wing and having at least one primary pitch control surface,</u>
wherein~~:~~ the controller is ~~capable of transferring~~ <u>adapted to set the at least one primary pitch control surface and transfer</u> fuel among the plurality of fuel tanks to adjust the aircraft center of gravity <u>in coordination</u> to ~~maintain aircraft stability during flight~~ <u>adjust angle-of-attack alpha (α) to prevent canard stall</u>.

12. (Presently amended): The system according to Claim 8 <u>further comprising</u>:
<u>a plurality of control effectors coupled to the fuselage and/or wing,</u>
wherein~~:~~ the controller is ~~capable of transferring fuel among the plurality of fuel tanks to adjust the aircraft center of gravity and adjust the aircraft longitudinal lift distribution throughout the flight envelope to maintain a low-boom, low-drag trim condition~~ <u>adapted to operate the aircraft in a maximum range, maximum Mach mode whereby the control effectors are deployed for relatively reduced trim drag and center of gravity is positioned relatively forward, and adapted to operate the aircraft in a relatively reduced-range, relatively lower Mach mode whereby control effectors are deployed for relatively increased trim drag and center of gravity is positioned relatively aft</u>.

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13. (Presently amended): The system according to Claim 8 wherein:

the controller transfers fuel among the plurality of fuel tanks to adjust the aircraft center of gravity in compliance with control laws to stabilize the aircraft ~~and provide satisfactory handling qualities to a pilot~~ by evaluating closed-loop aircraft responses to atmospheric disturbance.

14. (Presently amended): The system according to Claim 8 wherein:

the controller transfers fuel among the plurality of fuel tanks to adjust the aircraft center of gravity so that fuel in the forwardmost tanks is consumed first, and configuring the aircraft trim on attaining cruise condition at maximum aft center-of gravity ~~for a reduced~~ , reducing sonic boom ~~condition~~.

15. (Presently amended): An aircraft control system for usage in a supersonic aircraft including a fuselage and wing, the control system comprising:

a plurality of control effectors coupled to the wing;

a plurality of fuel tanks distributed within the wing and/or the fuselage,

a plurality of pumps coupled to the plurality of fuel tanks and capable of transferring fuel among the plurality of fuel tanks;

a plurality of actuators coupled to the control effectors;

at least one sensor capable of indicating a flight parameter; and

at least one vehicle management computer coupled to the at least one sensor, the plurality of pumps, and the plurality of actuators, the at least one vehicle management computer ~~capable of managing the~~ adapted to respond to the flight parameter to operate the control effectors and ~~transferring~~ transfer fuel among the plurality of fuel tanks to adjust aircraft trim and center of gravity position ~~to~~ and operate the aircraft in at least two flight modes, the flight modes ~~having different trim drag and sonic boom performance~~ including a reduced sonic boom mode wherein center of gravity is positioned relatively aftward.

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16. (Original): The system according to Claim 15 wherein:

the at least one vehicle management computer operates the aircraft in a maximum range, maximum Mach over water mode with control effectors deployed for

relatively reduced trim drag and center of gravity positioned relatively forward, and operates the aircraft in a slightly reduced range, relatively lower Mach over land mode with control effectors deployed for a slight increase in trim drag and center of gravity positioned relatively aft to reduce sonic boom.

17. (Original): The system according to Claim 15 wherein:
the at least one vehicle management computer controls the fuel tanks to burned in sequence for aircraft center of gravity so that fuel in the forwardmost tanks is consumed first, and configuring the aircraft trim on attaining cruise condition at a maximum aft center-of gravity for a reduced sonic boom condition.

18. (Original): The system according to Claim 15 further comprising:
a plurality of fuel boost pumps positioned outside of the fuel tanks for the ease of accessibility and maintenance without defueling the aircraft, the fuel boost pumps including dual boost pumps in forward and aft fuselage feed tanks, fuel from the forward fuselage tank being supplied to engines first to begin shifting the aircraft center of gravity aft in preparation for supersonic flight, upon fuel in the forward fuselage tank being consumed to a predetermined level aft fuselage dual boost pumps continuing supplying fuel to the engines.

19. (Original): The system according to Claim 15 further comprising:
a fuel scavenge system that removes remaining fuel in fuel tanks using a cross feed valve connecting left and right fuel feed manifold in the event of total fuel failure on either side; and
an intertank shut off valve between forward and aft fuselage tanks for transferring fuel from one side to the other during the flight due in event of fuel imbalance.

20. (Original): The system according to Claim 15 wherein:
the controller transfers fuel among the plurality of fuel tanks to adjust the aircraft center of gravity to:
adjust the aircraft center of gravity to reduce trim drag and increase aircraft range;

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adjust the aircraft center of gravity to reduce trim criteria to increase aircraft controllability;

adjust the aircraft center of gravity to maintain aircraft stability during flight; and

adjust the aircraft center of gravity and adjust the aircraft longitudinal lift distribution throughout the flight envelope to maintain a low-boom, low-drag trim condition.

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